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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHRISTOPHER G. TAYLOR and YONG HUANG

Appeal 2009-010547[1]
Application 09/386,605
Technology Center 1600

Decided:[2] April 30, 2010

Before TONI R. SCHEINER, RICHARD M. LEBOVITZ, and FRANCISCO C. PRATS, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal under 35 U.S.C. § 134 involves claims to a method for producing plants with transgenic root tissue. The Examiner rejected the claims as obvious.

We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

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[1] Monsanto Company is the real party in interest (App. Br. 2).
[2] Oral argument was presented in this case on April 14, 2010.

STATEMENT OF THE CASE

Claims 1 and 8-11 stand rejected and are on appeal (App. Br. 2).

Claim 1 is representative and reads as follows:

> 1. A method for producing a stably transformed chimeric dicotyledonous plant having transgenic root tissue, the method comprising the steps of:
>
> obtaining a stem or hypocotyl explant from a selected dicotyledonous plant species, wherein the hypocotyl explant has a cut end below the cotyledon;
>
> transforming the stem or hypocotyl explant with *Agrobacterium rhizogenes* containing an exogenous nucleic acid sequence capable of being transferred to the explant, wherein the cut end of the hypocotyl explant is contacted with the *Agrobacterium rhizogenes*;
>
> culturing the transformed explant in a root initiating media to produce transformed roots; and
>
> transferring the transformed roots to soil or a hydroponic environment to produce a chimeric dicotyledonous plant having transformed roots and wild type shoots, stems and leaves, wherein the dicotyledonous plant is soybean.

The sole rejection for our review is the Examiner's rejection of claims 1 and 8-11 as obvious in view of Trulson,[3] Savka,[4] and Simpson[5] (Ans. 3-7).

DISCUSSION

The Examiner cites Trulson as disclosing a process that uses *Agrobacterium rhizogenes* to generate cucumber plants with transgenic root tissue, and wild type shoots, stems, and leaves, but concedes that Trulson

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[3] EP 0 262 972 A2, published April 6, 1988.
[4] M.A. Savka et al., *Induction of Hairy Roots on Cultivated Soybean Genotypes and Their Use to Propagate the Soybean Cyst Nematode*, 80 PHYTOPATHOLOGY 503-508 (1990).
[5] Robert B. Simpson et al., *A disarmed binary vector from Agrobacterium tumefaciens functions in Agrobacterium rhizogenes*, 6 PLANT MOLECULAR BIOLOGY 403-415 (1986).

"does not teach soybean" as recited in claim 1 (Ans. 6). The Examiner cites Simpson as disclosing the use of *A. rhizogenes* to transform soybeans, and Savka as disclosing *A. rhizogenes* strain K599 as the most effective strain of the organism for inducing hairy roots in soybean (*id.*).

Given these teachings, the Examiner concludes that an ordinary artisan would have considered it prima facie obvious to apply Trulson's methods to soybeans (*id.* at 6-7). The Examiner reasons in particular that it would have been desirable to select plants with transformed roots, but wild type shoots, stems, and leaves, so as to confer pest resistance to the root tissue, and also "due to the resistance of countries to import genetically modified food . . . so that the[] soybeans could still be used for export" (*id.* at 5).

Appellants contend, among other things, that Trulson's process does not include the claimed steps of inducing root growth on a hypocotyl explant transformed with *A. rhizogenes*, and then, once transformed roots are produced, transferring the roots to soil or a hydroponic medium to produce a chimeric plant with transformed roots, but wild type shoots, stems, and leaves (App. Br. 6).

The Examiner disagrees, and urges that Trulson "use[s] an explant capable of maintaining a non-transgenic stem, leaves and other parts of the plant, as evidenced by the results under selection of plantlets with kanamycin" (Ans. 10). Thus, the Examiner argues, the "only difference is in the selecting of such chimeric plants rather than throwing them away and such a selection is suggested by Savka et al as discussed in the office action, wherein the targeting of root pests such as nematode are desired and are known to attack the roots of soybeans" (*id.*).

We conclude that Appellants have the better position.

While it is true that claims are to be given their broadest reasonable interpretation, the Examiner must "determine[] the scope of claims in patent applications *not solely on the basis of the claim language*, but upon giving claims their broadest reasonable construction 'in light of the specification as it would be interpreted by one of ordinary skill in the art.'" *Phillips v. AWH Corp.,* 415 F.3d 1303, 1316 (Fed.Cir.2005) (emphasis added) (quoting *In re American Academy Of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

Claim 1 requires the soybean roots transformed by *A. rhizogenes* to be transferred to soil or a hydroponic environment to produce a chimeric plant with transformed roots but wild type shoots, stems, and leaves. As Appellants argue, and the Specification explains, this is accomplished by transferring not only the transformed roots, but the attached hypocotyl explant, to the soil or hydroponic setting. *See* Spec. 7-8:

> Once roots begin to grow, the entire plant may be planted in soil or grown hydroponically. . . . All transgenic root growth is supported by the resources produced in the wild type shoots, stems, and leaves. This method relies on the cotyledons or excised shoots to provide the necessary resources for hairy root production, thus eliminating the need for sugars or other carbon sources that would allow for easy contamination of the media.

This process is reflected in the claim language reciting steps of "culturing the transformed explant . . . to produce transformed roots" and then "transferring the transformed roots . . . to produce a chimeric . . . plant." Thus, when given its broadest reasonable interpretation in light of the Specification, claim 1 does not encompass processes in which the

transformed roots are separated from the hypocotyl explant that was inoculated with *A. rhizogenes*.

Trulson, however, explicitly discloses that the transformed roots generated from inoculated hypocotyl explants were "excised" from the explants, and cultured in a medium allowing the emergence of "embryoids" on the root surface (Trulson 6). In addition, before being transferred to the medium ultimately allowing regeneration of whole plants, Trulson's embryoids were also "detached" from the transformed roots (*id.*).

Thus, not only were Trulson's plants ultimately generated from excised roots, which is excluded from claim 1, they were also generated from embryoids that were separated from the roots.

Neither of the secondary references remedies this deficiency. Savka did not generate intact plants but instead focused on preparing soybean hairy root cultures via *A. rhizogenes* transformation, the root cultures being useful in turn for culturing nematodes (*see* Savka 503 (abstract)). While Simpson also described gene vector methods using *A. rhizogenes* (Simpson 403 (abstract)), the Examiner does not point to, and we do not see, any disclosure describing methods useful for regenerating whole plants from the transformed root tissue.

Accordingly, for the reasons discussed, we are not persuaded that the cited references would have prompted an ordinary artisan to perform the process required by claim 1, when that claim is given its broadest reasonable interpretation consistent with the Specification.

We are also not persuaded that Trulson inherently produces the stably transformed chimeric plants required by claim 1, as the Examiner seems to argue. We acknowledge that, while Trulson only tested leaf tissue for the

kanamycin resistance marker of NPT activity (Trulson 6), Trulson also discloses that kanamycin selection at the root-generating stage produced roots that regenerated into plantlets lacking NPT activity in the leaves and therefore wild-type plantlets were not necessarily selected against (*id.* at 7).

However, Trulson simply did not test the root tissue of the NPT negative plants to determine whether the roots contained the transgenes, nor did Trulson explicitly characterize any plants as being chimeric. Given these facts, and the differences between Trulson's process and the claimed process discussed above, we are not persuaded that the evidence of record supports a finding that Trulson actually produced the stably transformed chimeric plants required by claim 1.

As we do not agree that the cited references would have prompted an ordinary artisan to perform a process having the steps recited in claim 1, to yield the chimeric plant required by claim 1, we reverse the Examiner's obviousness rejection of that claim, and its dependents.

REVERSED

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